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Genetic algorithm of network graph multi-objective optimization as an instrument of project monitoring

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Abstract

© 2015 Canadian Center of Science and Education. All rights reserved. Proper tracking of progress remains a vital part of modern project management, defining prospects of successful implementation of planned tasks. There are several popular concepts of project monitoring, such as logical framework approach (LFA), earned value management (EVM), etc., and each of them depends on properly optimized network graph that represents dependences between project tasks. Article describes the features and problems of multi-objective optimization in project management with reference to network graphs. The significant role of network graph optimization for project monitoring systems is proved and the model of multi-objective optimization of the network graph on criterion functions of duration and project cost based on NSGA-II genetic algorithm is proposed as the main purpose of research. Model takes into account the reserves of time on a critical way of the network graph, possibility of decreasing the load of available resources at the expense of time reserves on non-critical ways of the network graph, variety of used resources and options of delegation. One of its main advantages is quite low laboriousness of implementation, that depends on number of nodes on the network graph of the project and on number of possible options of delegation for the project tasks with several alternatives of delegation. Model has been tested on sample project with real data and results have been analyzed.

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Keywords

Genetic algorithms, Multi-objective optimization, Network graphs, Project monitoring, Project scheduling